

Policies and Programmes targeting KISA in the Finnish software industry (Step 2)

A working paper for the OECD KISA Focus group
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This document presents the results of **Step 2** of the Finnish contribution to the software element of the OECD KISA-project which consists of the following three steps :

1) ‘Profile and Trends of the Software Industry from a KISA / Innovation perspective’, provides a statistical review of the Finnish software sector (Step 1).

2) ‘Policies and Programmes targeting KISA in the Finnish software industry’, provides an overview of the policy measures targeting the Finnish software related services (Step 2).

3) ‘Knowledge-Intensive Service Activities Facilitating Innovation in the Software Industry’, is a more in-depth case study on software services and related KISA (Step 3).

Finland has also undertaken studies on KISA and healthcare, forenrel and leisure in the framework of the OECD KISA-project to explore the role of knowledge intensive services in innovation.

Country reports related to the project are available at www.oecd.org/sti/innovation, see item “Sectoral Case Studies in Innovation” under “*Don’t miss*”

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Executive summary

This report concerns policies, agencies and measures targeting the supply, quality and demand for knowledge-intensive services in Finland. Focus of the survey is on software industry (ICT¹) related measures. On the national innovation system level only those parts have been addressed that can be seen as most relevant from the software related KISA perspective.

In general there are very few sector specific policies in Finland. This applies also to the software- and ICT industries. Hence, more specific issues, (such as the supply, quality and demand for KISA in the software industry), are even less likely targets of specific policies. This situation becomes clearly documented in this report. Less than ten measures are targeting KISA, and only one technology programme, “*The Methods and Instruments of Software Production*”, is specifically targeting software related KISA. Even this particular programme is still at a proposal stage and it will be launched once the final positive decision has been made. A number of other measures and actors aiming at software and KISA development are reviewed in the report. These include: ministries and government agencies, business innovation supports, financing instruments, research-, development-, and technology programmes.

Statistics show that services count currently nearly two thirds of the GNP in Finland. Knowledge intensive services can be pointed out as particularly dynamic and rapidly growing area within the service sector. On the highest political level this development has been acknowledged in the government programme document. In 1999, knowledge intensive services were first included in the government programme which outlines the cabinet priorities. Since then several ministries, government agencies and instruments have recognised knowledge intensive services as a priority development area. The limited number of new measures targeting KISA, and software related KISA in particular, does not signify lack of activity in the area. Many actors have included KISA in the focus of their existing measures by altering their financing criteria. This has rapidly increased the number of potential support instruments. KISA enterprises can now utilise most of the available training, consulting services, business environment supports, financing instruments and programmes that are targeted for fast growing enterprises. However, it will take some time before the full potential of the available tools will be realised, and the policy really starts to deliver against its targets.

Public sector interventions also have many indirect impacts on the development of KISA. Typical for the Finnish technology and innovation policy has been long-term development of knowledge and know-how. Central elements in the innovation system are education and training, research and development, and knowledge-intensive business. Potentially all such development activities can improve the framework conditions for the KISA development. As a whole, technology and innovation policies are stimulating knowledge development across the economy. Such measures can improve businesses overall ability to make use of knowledge intensive services, and hence stimulate the demand also for the software related KISA.

¹ In several instances same public sector measures target both software and ICT industries. Hence, it is difficult to limit the discussion purely to the software industry related measures.

Measures that seek to promote the *supply of KISA* include grants offered by the Ministry of Trade and Industry (MTI), and training support for KISA professionals offered by the Ministry of Labour (MOL). These measures are delivered across the country via 15 Employment and Economic Development Centres (TE-Centres). Instruments in use include investment and development grants, and graduate entry programme (skills development training) for KISA professionals. The aim of the training is to help professionals to move away from contracting sectors to growing ones such as KISA. Other instruments that can improve the supply of KISA include business incubators that offer education, consultation and expert advice for companies in the early stages of their business. Most business incubators offer also premises, office equipment, administrative services and ICT-services.

Measures that seek to improve the *quality of KISA* are often targeted to growth enterprises and KISA firms are frequently represented in this target group. Quality of KISA can also be improved through continuous training that aims for skills up grading among engineers and ICT-professionals, in particular. There is also a scheme that aims at professional skills development in practical business context (KEKO). Here experts are placed in businesses where their expertise is made available for the business, and at the same time professionals get chance to upgrade their own skills.

Measures that seek to stimulate the *demand for KISA* are mainly delivered through the 15 Employment and Economic Development Centres. Each one of these centres has a pool of accredited consultants who can offer a range of consultancy services at subsidised prices. These services are served as service products specialised in different stages of business lifecycle, such as: start-up, R&D and commercialisation of a new products, business growth, productivity development, and electronic commerce etc. In addition to subsidised consultancy products businesses can have grants for different types of tailored development projects. These consultancy products ensure that management consultants offer similar type of services across the country (supply & quality). Possible demand related effects represent indirect effects as a result of subsidised daily rates for small firms.

Measures that aim at business environment development have important role in the regional development. Under these schemes development projects aim at KISA development across the country. This is seen as an important task, since the supply of KISA in Finland is very much concentrated around the capital region. Regional development projects can, for instance, map regional supply and demand for KISA, and try to identify possible bottlenecks and development needs.

1 Introduction

This section of the software study is focusing on public sector measures targeting the software industry. Particular attention will be paid on policies and programmes enhancing the supply, quality and demand of knowledge-intensive service activities (KISA) in the software industry.

The objective of this section is to illustrate, how government innovation policies have recognised and targeted KISA at the software sectors and supported their development? First section presents key facts of the Finnish software sector and its development potential. This is followed by a review of Finnish innovation policy as framework conditions for the KISA development activities. The following sections describe measures that seek to influence the supply, demand or quality of software related KISA. Finally, the analytical notes summarize the identified public sector measures and their influence on software sector related KISA.

Key information sources for this paper include expert interviews, documents and web sites of the various agencies responsible for the policies or programs. Important document sources include the evaluation of Finnish innovation system² as well as the EU commission Trend Chart database for Innovation³.

1.1 Software sector in Finland

Software industry and related knowledge intensive services have a significant role in the knowledge society. In Finland the size of the software market in 2001 was slightly less than 1,1 billion euros. The value of the software product business generated by Finnish companies was 892 million euros for the same period, with the share of exports rising to more than 400 million euros. The growth of Finnish software business has been extremely rapid. In 2001 the sales of software product companies was four times larger and the share of export five times larger than the corresponding figures in 1997. (Tarjanne & Ruusunen, 2003).

Software sector is still relatively small, albeit a central sector influencing the economic growth potential of Finland. The industry itself has significant growth potential. However, the last few stagnant years, lack of financing and constrained R&D resources may delay the realization of the high growth expectations. (Toivonen, 2002.) Since the burst of the IT-bubble the financing markets reacted strongly by closing up the finance for the early-stage knowledge-intensive companies. Dozens of venture capitals operating in Finland has closed down and few of them left are mainly concentrated in more secure later development phase companies that have passed their innovation phase. Hence, the importance of public support instruments has grown significantly. (Tarjanne & Ruusunen, 2003)

It has been estimated that after the slow growth at the turn of the millennium, the global software market will achieve an annual growth of more than 10% over the next

² Geoghiou et al., 2003

³ www.cordis.lu/trendchart

few years. Hence, the software industry may well develop into one of the most important pillars of the Finnish industry, once the positive trend in the software industry speeds up. (Tarjanne & Ruusunen, 2003).

1.2 Service sector and knowledge intensive services role in the Finnish economy

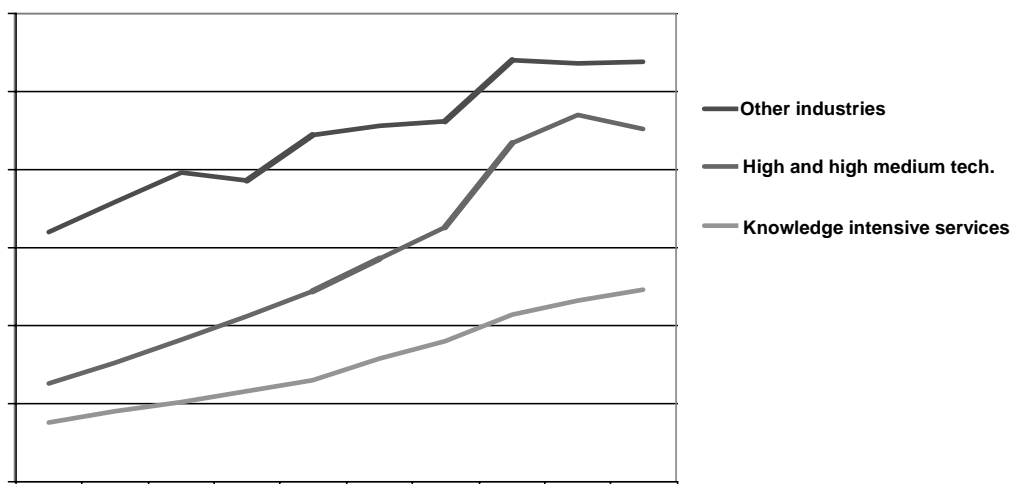
Service sector and knowledge intensive services are increasingly important for the Finnish economy. The following summary presents findings from some recent studies (Toivonen, 2001; Mankinen, Rouvinen and Ylä-Anttila, 2002):

- The growth of the service sector has been faster than the economy overall. In particular knowledge intensive services have represent rapid growth sector in the economy.
- Productivity in services has increases faster than that of the overall economy, however, Finland still lacks behind in international comparison
- Knowledge-intensive services are seen as a key element of the national innovation system where they have several important tasks
- Knowledge-intensive services are highly concentrated in the capital region of Finland – raising an issue of demand and supply of KISA in other regions
- Welfare-services represent an essential element of the society and there is pressure to develop new innovative services within this sector
- New technology is seen to represent a great development potential, as it enables a wide range of new innovative services as well as new ways to deliver existing type of services
- KISA role within traditional industries is growing rapidly.

Statistics show that services count currently nearly two thirds of the GNP in Finland. However, statistics indicate only the growth that comes from the ‘service industries’. In addition to this ‘visible’ growth, other industries are rapidly adding service business elements to their core production activities. Hence, the service activities have even more important role than statistics indicate.

Knowledge intensive services can be pointed outs as particularly dynamic and rapidly growing area of the service sector as the exhibit 1 indicates.

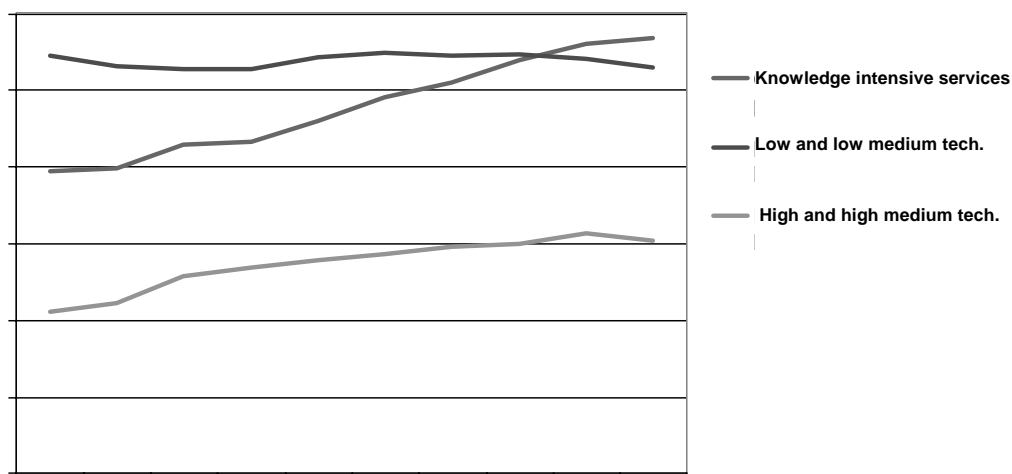
Exhibit 1 The development of turnover according to technology level and knowledge intensity



Source: Statistics Finland

Businesses representing knowledge intensive services have increased their turnover steadily over a decade and this trend seems to continue.

Exhibit 2 The number of employees according to technology level and knowledge intensity



Source: Statistics Finland

Also the number of employees in the knowledge intensive services has grown steadily. Since 2000 businesses in the knowledge intensive services have hired more employees than businesses that represent low and medium level technologies. The above presented growth trends have attracted attention among the highest-level decision makers in Finland. While the awareness of KISA and their importance is

increasing, policies also appear to be delivering against that target. The following sections will illustrate how service related issues have developed on the innovation policy agenda.

2 Innovation policy in Finland

2.1 Introduction

There are very few industry specific innovation policies and programmes in Finland. Hence, only a few measures are explicitly targeting the software industry or related KISA on a sectoral basis. However, many of the existing measures can be used to promote software related KISA. These government interventions can have a direct impact on software related KISA but numerous measures have indirect influence on the supply, demand and quality of software related KISA. Therefore, the following sections will cover also a range of more general policies and innovation related programmes that bear influence on KISA.

2.2 Key characteristics of Finnish innovation policy

Recession of the early 1990s can be seen as a turning point for the Finnish innovation policy. Since then, the development of the Finnish innovation system and knowledge-based society has been at the top of the policy agenda. These are seen as key ingredients of growth and competitiveness of the national economy (European Commission, 2003). Structural change from an economy based on natural resources towards knowledge-driven economy has progressed over several decades but with rapid acceleration in the 1990s. However, performance of the service sector has failed to match that of manufacturing (Geoghiou et al., 2003).

Typical for the Finnish technology and innovation policy has been long-term development of knowledge and know-how. It has gradually evolved from separate examinations of different components to a more comprehensive approach, which looks at the producers and users of knowledge as an entity. This entity is known as the national innovation system, which is composed of the producers of new knowledge and know-how, their users and the various ways in which these interact. Central elements in the innovation system are education and training, research and development, and knowledge-intensive business. A key task for science and technology policy is to ensure a balanced development of the innovation system and promote cooperation within it. Alongside this, growing importance is given to collaborative relations with other societal sectors, such as economic, industrial, labour, environmental and regional policies and social and health care. Knowledge and know-how in their different forms are seen as key factors for societal development. An efficient and effective national innovation system and regional systems are an increasingly important factor for economic growth and social welfare. (Seppälä, 2002).

Recently Finland has been recognized as one of the leading countries in innovation. However, it has been recognized that in the globalised environment innovation policy needs constant development to be able to serve industry. Recent evaluation

(Georghiou et al., 2003) indicates that Finnish innovation support system functions reasonably well with no obvious gaps and the different organisations are mostly performing the tasks they are mandated to do. However, the situation is dynamic and the agencies are repositioning themselves. Overall the evaluation highlights the following characteristics of the Finnish innovation system:

- International comparisons show excellent performance in both input and output indicators since the mid-1990s. However, input growth has exceeded output growth;
- Favourable technology policies contributed to the success of the 1990s but were only one of several factors, including the role of the business sector and decentralised decision-making;
- Traditional industries remain vital for the Finnish economy and are capable of sustained innovation and growth involving the creative combination of different vintages of technologies spanning industry boundaries;
- Finland is specialised in the production of ICT but lags in its use, especially in the non-manufacturing sector. The ICT boom appears to have crowded out entrepreneurship in other sectors. Corporate spin-offs provide an important means to redress this.

2.3 Areas of innovation policy that need further development

Recent evaluation of Finnish innovation system (Georghiou, 2003), identified a number of issues that would benefit from further improvements. Perhaps the most important one is the notion that emphasis in the system should shift from technology to innovation with more emphasis upon the integration of user perspectives⁴ in to innovation projects. Other focus areas for development include:

- Forthcoming changes in IPR legislation may necessitate reconsideration of other innovation support tools.
- There is a partial overlap between the public and private sector in provision of both finance and services. Clear identification of market and system failures is needed to justify intervention on each specific area.
- Firms should not rely in the long-term for assistance from subsidized public services and must be encouraged to shift to private suppliers in due course and where available.
- More transparency is needed, both in informing customers about the complex set of services available and (for regional aid) on the criteria against which aid is disbursed.

These focus areas; innovation promotion, IPR issues, public provision of services, promotion of private sector provision, and effective markets all together represent

⁴ By definition knowledge intensive services involve interaction between user and supplier of the service. Hence, knowledge intensive services can provide a crucial linkage between technology developers and users. For more detailed discussion, see e.g., Kuusisto, J. and Meyer, M. (2003), Insights into services and innovation in the knowledge intensive economy, Tekes Technology Review 134/2003, Helsinki, Finland.

framework conditions, that bear great influence on the development of knowledge intensive services.

3 KISA in the Finnish innovation policy

This section first illustrates how knowledge intensive services have been acknowledged in the Finnish innovation policy. Secondly, it presents some key data that provides a rationale for the growing policy interest towards KISA. Above all, indicators that demonstrate the growing importance of the service sector as a whole, and knowledge intensive services in particular.

Evidence of the growing attention from the decision makers can be seen from the key policy documents that address the issue of knowledge intensive services. On a highest level the government programme document outlines the cabinet priorities and knowledge intensive services have been included among them since 1999.

‘The Government will emphasise measures to improve the position and standing of employment supportive service output. R-and-D investment will also be directed towards the service sector and a programme of measures will be drawn up for knowledge-intensive service sectors to improve their export competitiveness’ (Lipponen II cabinet 1999-2003).

In terms of priority knowledge development and R&D can be seen as equally important as regional development and citizens well being:

- The welfare and security of the people will be ensured and the citizens' own efforts to improve their well-being will be encouraged
- Development based on knowledge and expertise will benefit all regions of the country equally and provide prerequisites to guarantee housing conditions and other services
- The growing resources in education, research and product development will promote strong economic growth and will inspire both the young and the older members of society to continuously update their skills and expertise

Regional development, welfare policies and knowledge development issues are closely intertwined in the Finnish policy. Notably, KISA have an important role in the regional development measure as well as in the welfare services. Both of these areas are in many ways depending on knowledge, new technologies and related services.

Following the highest-level attention on the government programme level, the importance of knowledge intensive- and welfare services have been addressed in a many policy documents produced by ministries and government agencies. The number of new KISA specific measures is still limited. Instead, many existing policies and instruments have been amended so that they can provide support also for the development of knowledge intensive services.

3.1 The promotion of supply, quality and demand of KISA

KISA enterprises can utilise most of the available training, consulting services, operating environment supports, financing instruments and programmes that are targeted for fast growing enterprises. This has been made possible by the fairly recent changes in the public sector financing criteria. Tekes, for instance, amended its financing criteria in 2003. Now it can target financing and R&D projects also for knowledge intensive service businesses as well as for the manufacturing firms. Similar changes are taking place in the ministries and other government agencies and it will take some time before the new criteria are fully deployed. Apparently the learning curve is fairly steep for the government executives as well as for the potential applicants of the support.

3.1.1 Promoting supply of KISA

Measures that seek to promote the *supply of KISA* include grants offered by the Ministry of Trade and Industry (MTI), and training support for KISA professionals offered by the Ministry of Labour (MOL). These measures are delivered across the country via 15 Employment and Economic Development Centres (TE-Centres). Instruments in use include investment and development grants, and graduate entry programme (skills development training) for KISA professionals. The aim of the training is to help professionals to move away from contracting sectors to growing ones such as KISA. Other instruments that can improve the supply of KISA include business incubators that offer education, consultation and expert advice for companies in the early stages of their business. Most business incubators offer also premises, office equipment, administrative services and ICT-services.

3.1.2 Promoting quality of KISA

Measures that seek to improve the *quality of KISA* are often targeted to growth enterprises and KISA firms are frequently represented in this target group. Quality of KISA can also be improved through continuous training that aims for skills upgrading among engineers and ICT-professionals, in particular. There is also a scheme that aims at professional skills development in practical business context (KEKO). Here experts are placed in businesses where their expertise is made available for the business, and at the same time professionals get an chance to upgrade their own skills.

3.1.3 Promoting demand for KISA

Measures that seek to stimulate the *demand for KISA* are mainly delivered through the 15 Employment and Economic Development Centres. Each one of these centres has a pool of accredited consultants who can offer a range of consultancy services at subsidised prices. These services are served as service products specialised in different stages of business lifecycle, such as: start-up, R&D and commercialisation of a new products, business growth, productivity development, and electronic commerce etc. In addition to subsidised consultancy products businesses can have grants for different types of tailored development projects. These consultancy products ensure that management consultants offer similar type of services across the country (supply & quality). Possible demand related effects represent indirect effects as a result of subsidised daily rates for small firms.

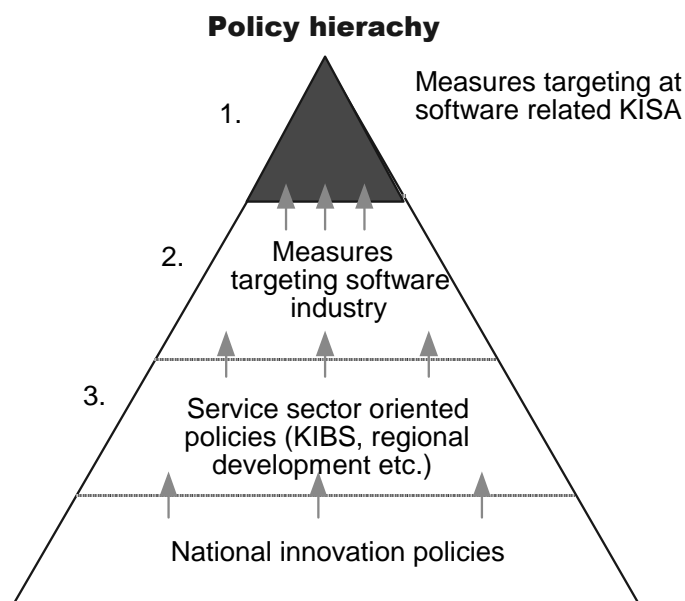
Measures that seek to develop favourable business environment have important role in the regional development. Under these schemes development projects aim at KISA development across the country. This is seen as an important task, since the supply of KISA in Finland is very much concentrated around the capital region. Regional development projects can, for instance, map regional supply and demand for KISA, and try to identify possible bottlenecks and development needs.

3.2 Indirect impacts from public sector interventions

Public sector interventions can have many indirect impacts on the development of KISA. Numerous activities that aim at knowledge development provide an example of indirect impacts. Potentially all such activities can improve the framework conditions for the KISA development. Knowledge development across the sectors can improve businesses ability to make use of knowledge intensive services, and hence stimulate the demand for KISA.

Exhibit 3 illustrates the current situation in Finland. Relatively few measures that are directly targeted to software sector related KISA, are on the top of the triangle. The lower levels of the triangle represent public sector interventions that may have indirect influence on the supply, quality and demand for software related KISA.

Exhibit 3 Direct and indirect influence of government measures on software related KISA



Only very few government measures are specifically targeting software related KISA. However, there are a number of initiatives that cater software and ICT development, both of which are seen as growth areas of the economy. The focus of this paper is on the measures whose main target is software development, or software related KISA.⁵

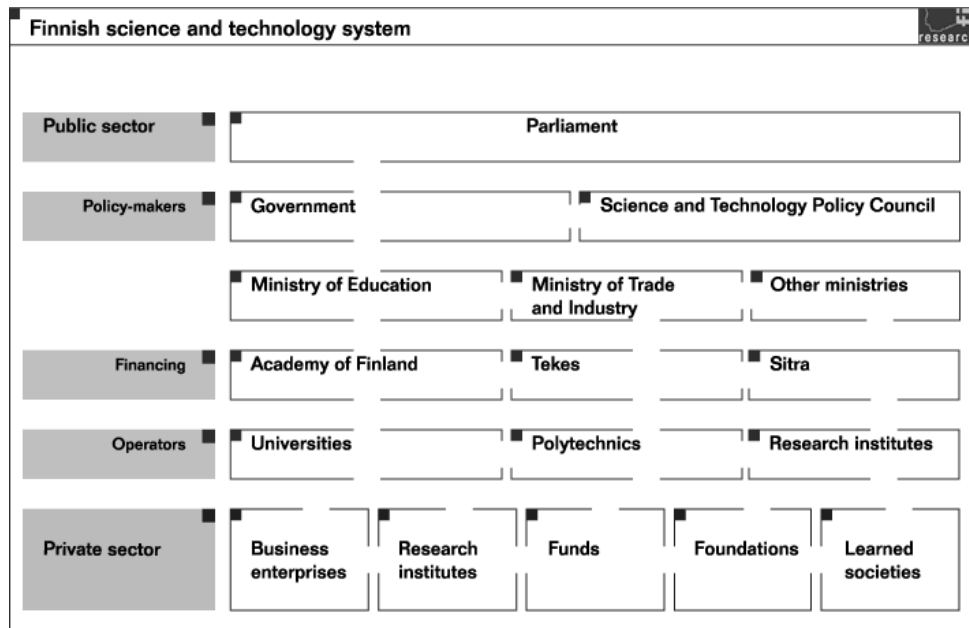
⁵ If a programme is targeted to totally different sector, say health care, but one of the programme goals is to produce or develop new software products for that sector, the programme is not included in this report. Such programmes are very common and the scope of the discussion would cover most of the current measures in place.

More general innovation policies are reviewed to the extent they appear relevant for software related KISA development.

4 The innovation policy system of Finland

Exhibit 4 presents a brief overview of the Finnish innovation system and the key actors that are involved in the KISA related policy development and execution.

Exhibit 4 The Finnish innovation system⁶



Government Programme represents the highest-level policy agenda in the country and it lists the key issues that will direct the activities of various ministries. More detailed national level science, technology and innovation policies are formulated by the Science and Technology Policy Council, which is chaired by the Prime Minister. The organisations with primary responsibility for science and technology policy are the Ministry of Education and the Ministry of Trade and Industry. The Ministry of Education is in charge of matters relating to education and training, science policy, institutions of higher education, and the Academy of Finland. The Ministry of Trade and Industry is in charge of industrial and technology policies. Also the National Technology Agency (Tekes) and the Technical Research Centre of Finland VTT are under the control of MTI. Approximately 80% of the government research funding is channelled through these two ministries (Seppälä, 2003).

Following chapters will offer a brief review the Finnish innovation system starting with ministries and agency level organisations. Following this, business innovation supports, KISA specific financing instruments and services will be introduced. Finally, national level development programmes relevant for software related KISA will be presented.

⁶ Science and Technology Policy Council of Finland, www.research.fi

4.1 The Ministry level

Most of the ministries are involved in numerous activities that have indirect influence on supply, demand and quality of KISA. Such activities are based on high-level policy attention on knowledge development as a cornerstone of national competitiveness. However, only the Ministry of Labour, Ministry of the Interior, Ministry of Education and Ministry of Trade and Industry have direct measures that seek to promote knowledge intensive services.

4.1.1 Ministry of Trade and Industry (MTI)

As an expert in business environment policy the MTI plays a leading role in economic policy. The main function of the MTI is to improve the competitiveness of business sector and Finland as a business environment. These are seen as a cornerstones of sustainable development of employment. The Ministry supports research and development, as well as effective exploitation of new technology.⁷

The key innovation support organisations operating under the auspices of the MTI are The National Technology Agency of Finland (Tekes), Finnvera plc, Finnish Industry Investment Ltd (FII), Finpro, The Foundation for Finnish Inventions (FFI) and 15 Employment and Economic Development Centres (TE-Centres). Through the above listed agencies MTI offers a range of measures that support the development of supply, quality and demand for KISA, including various types of investment and development supports. Most of these instruments are available across the country via 15 TE-Centres.

4.1.2 The Ministry of Labour (MOL)

MOL promotes the effective functioning of the labour market, the development of work organisations, employment and the integration of immigrants.⁸ MOL organises training for the people aiming to work at rapidly growing KISA sector. Mainly such training is targeted on people seeking to develop new skills in order to change jobs from some contracting sector to an expanding area where job opportunities do exist.

4.1.3 The Ministry of the Interior

The Ministry of the Interior has the responsibility for local and regional administration, regional development and internal security in Finland.⁹ The Ministry of the Interior's Centre of Expertise Programme (CoE) is a fixed-term (1999-2006) special programme that in accordance with the Regional Development Act aims to pool local, regional and national resources to utilise high-level expertise. CoE supports regional specialisation and cooperation between different Centres thus generating a strong, effective network of 22 Centres of Expertise.

4.1.4 The Ministry of Education

⁷ The Ministry of Trade and Industry, www.ktm.fi

⁸ The Ministry of Labour, www.mol.fi

⁹ The Ministry of the Interior, www.sisaministerio.fi

Within the Finnish Government, there are two ministers at the Ministry of Education: the Minister of Education and Science is in charge of matters relating to education and research; the Minister of Culture is responsible for matters relating to culture, sports, youth, copyright, student financial aid and church affairs. The Ministry of Education is responsible for developing educational, science, cultural, sport and youth policies as well as international cooperation in these fields. The Ministry creates favourable conditions for education, know-how, lifelong learning, creativity and citizens' social participation and well-being.¹⁰ The Academy of Finland is an agency in charge of basic research and it operates within the administrative sector of the Ministry of Education.

4.2 The Agency level

Government agencies offer their services across the industries and there are not industry specific actors. However, software sector is often seen as a key industry that has significant growth potential, partly because it is linked to wider issues around technology development and information society development. Currently only few agency level actors are explicitly addressing KISA and they receive more detailed attention in this paper.

4.2.1 National Technology Agency of Finland - TEKES

Tekes operates under the MTI, and is the main public financing and expert organisation for applied research and technological development in Finland. The key instruments of Tekes are industrial R&D grants and loans to firms, and grants for applied technical research for public organisations. Tekes finances projects through selective project funding with a particular focus on innovative, risk-intensive projects. In 2002 Tekes' R&D funding was 381 million euros. These funds granted will be paid between 2002-2007.¹¹

Recently Tekes has widened its scope from technology development towards wider innovation support, including knowledge intensive services. Accordingly, Tekes vision, strategy, technology programmes as well as financing criteria have been adjusted so that they can accommodate service development. Service development was first recognised in Tekes mission statement in 1997, the primary objective of Tekes is "to promote the competitiveness of Finnish industry *and the service sector* by technological means". Such activities aim at development of diversified production structures, increase in production and exports. These are seen as a foundation for employment and societal well-being. By the year 2000, Tekes vision was up-dated so that knowledge intensive services were regarded as a new, growing business field alongside the strong Finnish industrial core clusters. In 2002 Tekes recognised knowledge intensive services as one of the four key application areas of their technology strategy. In particular, the following areas of service development are focused (Tekes annual review 2002):

- new communication technology enabled services
- product and production integrated services

¹⁰ The Ministry of Education, www.opetusministerio.fi

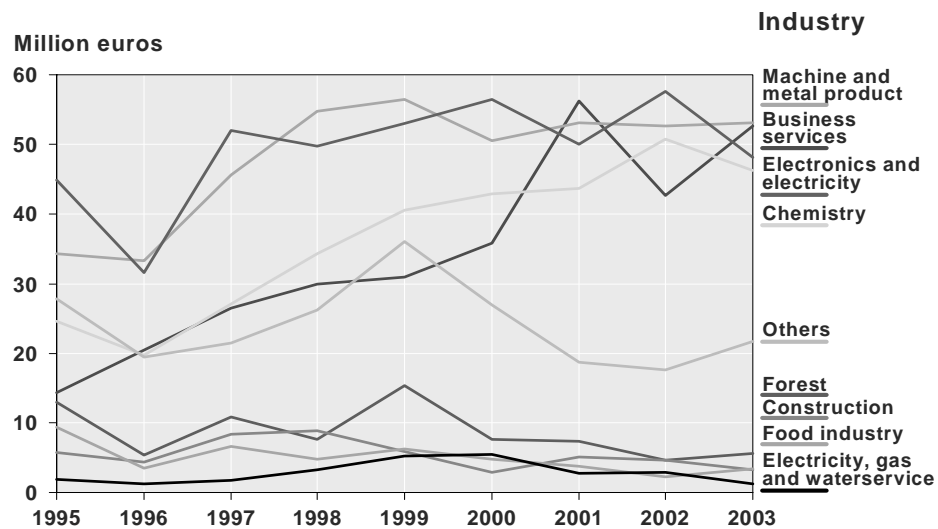
¹¹ The National Technology Agency of Finland, www.tekes.fi

- knowledge intensive business services

Since 2003, Tekes financing instruments are equally suited for the development of technological products and services. The aim is to develop knowledge intensive services sector so that the demand, supply and quality of such services can effectively support the overall performance of the innovation system. It has also been recognized that ICT enables a range of new services that can be promoted. Finally, services can play a role in the renewal of traditional industries.

Project financing is directed according to criteria described in Tekes' mission statement. Based on strategic choices, the funding is partly targeted at key thematic areas - of which knowledge intensive services is now one – vital to the economy and society. Selection of key thematic areas is based on continuously updated technology strategy. Typically Tekes bundles projects into technology programmes, organised around specific sectors of technology or industry. Such programmes have proved to be an effective form of cooperation and networking for companies and the research sector. Usually Tekes finances about half of the costs of programmes and the second half comes from participating businesses. Overall, the current focus has resulted to steadily increased financing to services since 1995 as the following picture illustrates.

Exhibit 5 Distribution of Tekes financing by business sector



Source: Tekes

The increase in finance for business services seems otherwise steady, but in 2001 there is rapid peak, which is apparently due to a three-year technology programme Software Product Industry – SPIN (SPIN is outlined in chapter 4.5.3. Programmes for software sector).

4.2.2 Employment and Economic Development Centres (TE-Centres)

TE-Centres are public offices operating under the supervision of MTI, Ministry of Labour, and Ministry of Agriculture and Forestry. MTI is responsible for their general administration. TE-Centres consist of 15 regional offices with business departments providing a wide range of services for business start-ups and growth firms. Te-Centres provide business support services, consultation, advice and finance.

They also serve as a regional network for the other organisations and provide a country wide service outlet. For example EU funding and Tekes' services and financing instruments are available through TE-Centres.¹² TE-Centres have also developed a range of expert service packages for the SMEs. These are offered across the country and discussed in more detail in section 4.5.3.

4.2.3 The Academy of Finland

The Academy of Finland is an expert organisation on research funding. The object of the Academy is to promote high-level scientific research through long-term quality-based research funding, science and science policy expertise, and efforts to strengthen the position of science and scientific research. The operations of The Academy of Finland cover all scientific disciplines. The Academy operates within the administrative sector of the Ministry of Education and is funded through the state budget.¹³ The Academy of Finland has works in co-operation with Tekes in a number of issues. For example, *LIIKE* (Research Programme on Finnish Companies and the Challenges of Globalization – Business as Competition and Cooperation) is the first national research programme funded in collaboration with the Academy of Finland and Tekes in the field of business studies. The programme has many linkages to KISA related issues.

4.2.4 The Finnish National Fund for Research and Development - SITRA

Sitra is an independent public foundation under the supervision of the Finnish Parliament. A key feature of Sitra is that it has its own resource base, which makes it independent of budget funding. Sitra's activities are financed by the yield from its own endowment capital and the return on its venture-capital investments. Its activities are designed to promote the economic prosperity of the Finnish people by research and training, innovation and business development and venture capital. The aim is to establish and develop Finnish enterprises that are internationally competitive and profitable. Sitra is able to offer such companies both development and financing services. The focus lies on businesses that are at an early stage of their life-cycle.¹⁴ Sitra and Tekes have systematically developed co-operation and joint activities. Sitra's own development activities are focused on information society development and it is also promoting the use of knowledge intensive services in connection with its pre-seed financing programme Liksa.

4.2.5 Other agency level actors

The *Foundation of Finnish Inventions (FFI)* is mainly funded by the government, and it supports innovation related activities at their early phase. Among other things, it offers legal services related to patenting and other IPR-issues, market exploration and commercialisation studies. FFI staff is located in the head office in Helsinki, and across the country in the main universities and in the regional TE-Centres.¹⁵

¹² Employment and Economic Development Centres, www.te-keskus.fi

¹³ The Academy of Finland, www.aka.fi

¹⁴ The Finnish National Fund for Research and Development, www.sitra.fi

¹⁵ The Foundation of Finnish Inventions, www.keksintosaatio.fi

Finpro is an expert service organisation aimed for the internationalisation of Finnish firms. Finpro is partly financed from public funds. The activities of Finpro range from international marketing services to innovation networking with Tekes as a major partner.¹⁶

Finnish Industry Investment Ltd (FII) is a state-owned investment company, aimed at improving the venture capital market. The main instruments of FII are equity stakes in Venture Capital and regional funds, with a small array of direct investment in specific firms. FII is administered by the MTI.¹⁷

Finnvera plc. is a specialised financing company offering financing services to promote the domestic operations of Finnish businesses, and to further exports and internationalisation of enterprises. Finnvera offers loans, guarantees and export credit guarantees to suit the various stages of a company's business. It is Finland's official Export Credit Agency and act as an intermediary between the European Union's financing programmes and Finnish SMEs. Finnvera is owned by the Finnish state and administered by MTI.¹⁸

State research institutes. Finnish state owns 20 research institutes from various fields of expertise. The largest one of them is VTT Technical Research Centre of Finland. VTT's budgetary funding is almost one fourth of the total budgetary funding of research institutes. VTT is an impartial expert organisation that carries out technical and techno-economic contract research and development work, and produces information services. VTT also promotes technology transfer by producing a great deal of public research knowledge and by actively participating in both domestic and international research programmes and collaboration networks.¹⁹ Other state research institutes are e.g. National Public Health Institute, Finnish Forest Research Institute and National Research and Development Centre for Welfare and Health.

Finnish Information Society Development Centre (TIEKE) has a networking role as a neutral and non-profit organisation in promoting the efforts of its members, within the public and private sectors alike, with an ultimate goal to create viable tools and expertise for use in the information society. The main functions of TIEKE include initiation and coordination of selected development projects within the ICT industry, generation of an IT cluster, promotion of the use of ICT between organizations and in public access services, and production of interactive information services for companies, public administration and private citizens alike.²⁰

4.3 Business innovation support

In this report business innovation support refers to functional surroundings, which can enhance the commercialisation of research results, business start-ups and business development. The following services are available also for KIBS businesses which

¹⁶ Finpro, www.finpro.fi

¹⁷ Finnish Industry Investment Ltd, www.teollisuussijoitus.fi

¹⁸ Finnvera plc, www.finnvera.fi

¹⁹ VTT Technical Research Centre of Finland, www.vtt.fi

²⁰ Finnish Information Society Development Centre, www.tieke.fi

can benefit of these services, or provide these kinds of services themselves. Hence, such activities can influence demand, supply and quality of KISA.

4.3.1 Universities and polytechnics

Several universities are supporting the commercialisation of research-based business innovations through various types of development platforms. Currently Licentia Ltd is the largest one of such operations. It's shareholders include University of Helsinki, Helsinki University of Technology, VTT Technical Research Centre of Finland and Sitra. Licentia offers services to researchers and the academic community by identifying innovative technologies and marketing them selectively to companies.²¹ Also some polytechnics have similar activities such as business incubators, trainee recruitment and research services.

4.3.2 The Finnish IT center for science (CSC),

The CSC is owned by the Ministry of Education and it provides modelling, computing, and information services for universities, polytechnics, research institutions and industrial companies. The expert services in the field of science are meant for the academic research community as a whole. Services of the CSC are mainly provided free of charge for university and polytechnic researchers.²²

4.3.3 Science parks

Finnish science parks provide supportive platforms for the application of state-of-the-art technology, with direct links to the highest education and research in their own regions. Science parks offer premises and services for both high-tech start-ups and more established businesses. Finnish Science Park Association TEKEL is a nationwide co-operation network connecting 22 technology and science parks. The network consists of 1600 enterprises and other organisations, and 32000 experts working on different technology fields.²³

4.3.4 Business incubators

Business incubators offer business start-ups education, consultation and expert advice. Most business incubators offer also premises, office equipment, administrative services and ICT-services. In addition, business incubators facilitate networking between business start-ups and various other types of actors. Some of the business incubators are specifically targeting their support also for KISA enterprises.

Helsinki University of Technology and Otaniemi Science Park have a joint responsibility for the operation and development of InnoLinko-business incubator. Otaniemi Science Park is the biggest high-tech business incubator in the Nordic countries and a key unit of Innopoli group, which is the leading company generator in Finland.²⁴ Their mission is to create successful, competence-based businesses.²⁵

²¹ Licentia Ltd, www.licentia.fi

²² The Finnish IT center for science, www.csc.fi

²³ Finnish Science Park Association, www.tekel.fi

²⁴ Innopoli group, www.innopoli.fi

²⁵ Otaniemi Science Park, www.otech.fi

4.4 Financing instruments and services

The following sections will present the financing instruments and services offered by the public sector organisations in Finland. Most of the schemes offer grants for the client firms as well as expert services. All schemes presented promote the supply, demand and/or quality of KISA.

4.4.1 Funding for business idea development - LIKSA

Liksa is the joint financing scheme of Tekes and Sitra for promising early stage technology businesses that often face problems in obtaining capital. Liksa scheme was launched in spring 2001. Both Tekes and Sitra have committed to invest 2,69 million euros per year in this scheme. Such contribution is enough to provide Liksa financing for some 80 applicants each year. The joint management by Tekes and Sitra supports one key goal of the scheme, which is to build a bridge between technology and seed funding activities. Liksa financing can be used for preparing a good quality business plan, which is seen as a key element that enables access to private sector seed funding. LIKSA financing is mainly meant for the purchase of external expert services that enable systematic analysis of markets and competition.²⁶ Liksa financing creates demand for KISA, and thus promotes the use and development of expert services.

4.4.2 Technology Clinics / TUPAS

Tekes Technology Clinic project strives to promote the demand and supply of knowledge intensive services. This instrument promotes the transfer of technology and the spread of new methods and knowledge from research institutions and institutes of higher education to SMEs. The problems solved in clinics are of limited scope and not worth for launching a separate project. However, these problems are too challenging small firms to solve alone with their own capabilities. TUPAS clinics projects offer small firms a chance to learn how to use the services provided by Finnish institutes of higher education and research institutions. This is done by offering them easy access to their expertise and research knowledge. The most competent experts are selected for clinics and overseas expertise can be brought in if necessary. New clinics are founded when appropriate clusters of technology appear.²⁷

4.4.3 Expert service packages for SMEs

Existing 15 TE-Centres offer a variety support and development products for business start-ups and SMEs. These services offer hands on help in setting up a company as well as various types of management and business development training. The courses are targeted at entrepreneurs, business managers and operatives.²⁸

The expert service packages seek to improve the demand, supply and the quality of KISA. Courses and training services are usually carried out in the form of company-specific consultations between an external specialist and company management. Each

²⁶ www.sitra.fi/liksa

²⁷ www.tekes.fi/rahoitus/yritys/tupas

²⁸ www.te-keskus.fi/koulutuspankki/en

package contains 1 to 6 consultation days (plus 1 to 5 additional days if needed) and costs 80€ - 1260€ depending on the size and age of the business. The consultation services are heavily subsidized, typically by 80-95%. Such reduction in price is aimed at stimulating the demand for KISA. The supply of KISA is promoted by the fact that the services are offered through all regional TE-Centres. Quality of KISA is also addressed since the external consultants are required to participate in training before getting accreditation for the expert service package. The expert service packages most relevant for software enterprises include:

- ProStart - programme for evaluation and development of business ideas
- PostStart - analysis and development programme for start-ups
- DesignStart - programme for the development of design
- Myyntiteho - programme for improving marketing and sales skills
- Kunto – business ‘health check’ and development programme
- Balanssi - financial health development programme for SMEs
- Globaali - internationalisation programme for SMEs
- eAskel - programme for the development of e-business
- Monitaito – training for enterprise scheme
- ViestinVaihto – passing the business to the next generation in the family

4.4.4 Research into business - TULI

The main goal of TULI programme is to promote the birth of new, technology-based firms in Finland. The focus is on R&D activities in universities and research institutes. The aim of the programme is to enhance the awareness of commercialisation opportunities within research organisation and among researchers. The TULI scheme aims to identify and explore the chances for commercialisation of research-based ideas, and transfer that potential towards commercialisation and new ventures. The commercial potential of ideas is assessed with the help of external consultants. Typical tasks include market research, competitor analysis, and IP-issues. TULI scheme is managed by Tekes, The National Technology Agency of Finland and coordinated by Tekel, The Finnish Science Park Association. TULI is organised as a nationwide programme, where Tekes purchases the consultancy services from 8 regional Science Parks. The services are free for researchers and research groups, and participation in the programme doesn't restrict the proprietor's rights to his/her idea. TULI scheme seeks to improve the demand by offering free services for the researchers. Supply of KISA is being promoted by offering the services nationwide through 20 outlets. In 2003 the TULI financing was 2,3 million euros, of which 40% is targeted to the identifying and screening the ideas, and 60% to the realization of TULI projects.²⁹

4.4.5 VARA preparatory funding

The overall objective of VARA financing is to initiate a challenging research and development project. Available financing can be used in market research,

²⁹ www.tuli.info

competitiveness analysis, company's business plan development, technology strategy development etc. Usually these are short-term projects which include considerable amount of services purchased from external specialists. Tekes finances 70% - 100% from the acceptable expenses of the VARA project, however only up to 15 000 euros. VARA improves the demand of KISA because Tekes financing covers a good share of the expenses used in knowledge intensive services. In 2003 Tekes financed 553 VARA projects, their average size was 12 300 euros.

4.5 Research-, development- and technology programmes

There are a number of national programmes that offer possibilities for the development of software related knowledge intensive services. The programmes presented here are either targeting KISA or software firms directly, or have indirect impacts on software related KISA.

4.5.1 Programmes for KISA producing services for software firms

4.5.1.1 Centre of Expertise Programme (CoE)

CoE programme under the Ministry of the Interior is a fixed-term (1999-2006) special programme that in accordance with the Regional Development Act aims to pool local, regional and national resources to utilise high-level expertise. The objectives of the CoE are among other things to create a long-term strategy for the full utilisation of the top-level expertise in the regions and to create new products, services, companies and jobs related to top-level expertise. In order to reach their objectives, the centres of expertise among other things launch projects to develop businesses based on top-level expertise, make latest knowledge and expertise easily available to companies and increase cooperation between different bodies in the development of research and knowledge-intensive business. The selection of new Centres of Expertise now also allows for fields of expertise other than those that emphasise technology. New fields of this kind in the programme are new media, the recreational experience industry, culture, *software products* and design, quality and environmental know-how.³⁰

The Centre of Expertise for Software Product Business is part of the Helsinki Region CoE programme implemented by Culminatum Ltd. The CoE for Software Product Business cooperates with companies, universities and research centres of the Helsinki Region.³¹ This programme for software industry, promotes to some extent the supply and demand of knowledge-intensive service activities in the software industry, although it is not the specific focus of the programme. The total budget of the entire Centre of Expertise programme is 9 million euros in year 2004.

³⁰ The Centre of Expertise Programme, www.oske.net

³¹ Culminatum Ltd, www.culminatum.fi,

CoE for Software Product Business, www.uudenmaanosaamiskeskus.fi/ohjelmistotuoteliiketoiminta

4.5.1.2 Interactive Computing - FENIX

FENIX is a fixed term (2003-2007) Tekes Technology Programme. The main goal is the development of user-friendly application technologies and products/services for consumers, corporations and public sector bodies. FENIX has five focus areas

- Content management applications
- Game and entertainment
- Community network services
- Network services for industrial and service companies
- Mobile applications and services

The programme promotes services in general and software business in particular. It can also promote services that are aimed for software business. Mainly the programme can be seen as a measure that enhances the quality and supply of KISA. The total budget of the programme is 84 million euros of which Tekes finances 39 million euros. So far, 30 companies and 15 research organisations has participated in the programme.³²

4.5.1.3 Business concepts for industries (UTT)

UTT is a Tekes Technology Programme which seeks to develop business models, methods and tools needed in an on-line business. New services, service products and superior customer relation management can yield benefits for businesses in terms of greater efficiency, better competitiveness and higher profitability. The programme promotes projects that will implement and improve innovative software tools based on the latest IT. It will promote the global market reach through on-line modes of operation and new tools. New consultancy and software products will be spawned as well. The key themes pursued under the programme include modulation and standardization, supply chain management, company resource planning, brand management, customer/company relation management, knowledge management, product data management and document management, electronic commerce and new services. The UTT programme seeks to enhance the quality and supply of software products and software-related services, KISA in general and KISA targeting software sector. The total budget of the programme is 60 million euros of which Tekes has financed 0,7 million euros in 2003. 150 companies and 18 research organisations has participated in the programme.³³

4.5.1.4 The Methods and Instruments of Software Production

Tekes has introduced a goal-oriented³⁴ funding application process for business R&D projects in the field of software business. This technology programme is the only measure which explicitly states that it is targeted to software related KISA. The application process is aimed for:

³² <http://akseli.tekes.fi/Resource.phx/tivi/vaui/index.htm>

³³ <http://akseli.tekes.fi/Resource.phx/tuma/utt/index.htm>

³⁴ This technology programme is still in a proposal stage and it has not been launched yet. Goal oriented funding application process refers to a 'pilot application process' which seeks to measure the interest towards the scheme that is being prepared for launch.

- Software product businesses
- Businesses developing software-intensive products and systems (e.g. embedded software, bioinformatics, automation)
- Software project businesses (e.g. software-intensive products / software product subcontractors or software companies implementing customer projects of a one-time nature i.e. KIBS for software business)

This goal-oriented funding application process aims to encourage software businesses to introduce different kinds of methods and instruments that increase the quality and effectiveness of the business. The objective of the projects is not the development of new techniques or methods, but the challenging introduction and utilization of existing solutions. The budget has not yet been published.

4.5.2 Programmes aiming at KISA development

4.5.2.1 Research Programme on Finnish Companies and the Challenges of Globalization – Business as Competition and Cooperation – (LIIKE).

The primary goal of the LIIKE programme is to study the changes in Finnish companies and their management under increasing pressures of knowledge-based competition and finance-driven economy. Particular attention is devoted to the related development as well as new management skills and competence in Finnish businesses. Liike research programme has potential to foster the quality, demand and supply of KISA. The Academy of Finland finances the 3-year programme by 4,4 million euros and Tekes by 2 million euros. To date, 25 companies and 18 research organisations has participated in the programme.³⁵

4.5.2.2 E-Business Logistics, Challenges of e-business for Logistics (ELO).

ELO is Tekes operated and aims to find out what kind of challenges electronic business and collaborative networks place on Logistics. It also looks at the possibilities new emerging technologies can offer for management of physical material flow. The objective of the programme is to develop logistics so that it will improve the competitiveness and profitability of Finnish industry and service sectors. Business networks are growing in importance, and in networks the meaning of logistics as a factor of competitiveness is increasing all the time. ELO programme fosters the supply and quality of service sector, particularly logistics and related KISA. The total budget of the programme is 25 million euros of which Tekes has financed 5 million euros in 2003. So far, 121 companies and 21 research organisations has participated in the programme.³⁶

4.5.2.3 Networks of the Future - NETS

NETS programme focuses on research and development on the architecture of future wireless systems, implementation technologies and applications, broadband network technologies and applications and a number of service concepts and applications utilising new networks.

The objectives of the NETS programme are to:

- Promote the leading position of the Finnish telecommunications industry in technologies of wireless systems and broadband packet switched networks, and also in the technology sectors critical for the current and future business
- Generate new business opportunities for the markets of wireless and broadband networks, terminals, and software for achieving an internationally leading position

³⁵ <http://www.uta.fi/tutkimus/liike/>

³⁶ <http://akseli.tekes.fi/Resource.phx/tuma/elo/index.htm>

- Promote leading positions of Finnish enterprises as innovators and developers of applications, services, and contents based on the mobile and broadband technologies
- Expand and diversify the business and service activities utilising telecommunications technologies

The above listed NETS programme objectives can mainly promote the supply and quality of KISA. The total budget of the programme is 190 million euros of which Tekes has financed 22,6 million euros in 2003. So far 110 companies and 21 research organisations has participated in the scheme.³⁷

4.5.2.4 Distributed energy systems technology programme - DENSY

DENSY is a Tekes technology programme for the development of distributed energy systems. This comprises local small-sized units for producing power, heat or cold. The focal areas of the programme are:

- System solutions, meaning the better compatibility of intelligent components, IT-technology etc., modelling and dimensioning applications, automation, control and monitoring, and their internal standardizing
- Integration of different energy systems to customers premises
- Industrial manufacturing, meaning the development of mass production technologies, modularity, design, flexibility and lack of complexity, and the standardizing their techniques
- Business concepts, meaning the development of knowledge intensive energy services, new business models of companies, and decision-making tools and financing solutions of customers.
- Utilization of ICT-technologies. The development of platforms, applications, models and simulations to assess functionality and costs. Technical services, systems and equipment form an efficient service package
- Demonstrations for product feasibility

The main objectives of the programme are to assist Finnish industry, especially SMEs in developing products and services for a global market, make Finnish technology well known, build an innovation environment of world-class and produce commercial products for several niche-markets by 2010. In particular, knowledge intensive energy services, systems integrator services and solution selling elements of the Densy programme can promote the quality and supply of KISA in energy business. The total budget of the programme is 47 million euros of which Tekes has financed 12 million euros in 2003. As for the participants, 60 companies and 18 research organisations have participated the programme.³⁸

4.5.2.5 Security 2003 - TURVA

The objective of Turva programme is to promote the emergence of new technology-based businesses and to intensify co-operation in the security sector. The indirect

³⁷ <http://akseli.tekes.fi/Resource.phx/tivi/nets/index.htm>

³⁸ <http://akseli.tekes.fi/Resource.phx/enyr/densy/index.htm>

objective is to give rise to new project entities that will create new knowledge and competence for the entire security sector and improve societal welfare by improving the safety of public actors, enterprises and citizens. The projects must represent the forefront of technological development in their own fields and be associated with some of the following themes:

- Intelligent security-related products and security systems for the following partial areas of security;
 - Personal safety
 - Securing property
 - Real estate and facility security
 - Information and computer security
- Methods of security management
- Knowledge-intensive service business in the security sector

The programme promotes the supply and quality of KISA in security sector. The budget has not yet been published.³⁹

4.5.2.6 The Research Programme for Advanced Technology Policy - ProACT

ProACT is a technology programme jointly operated by MTI and Tekes. ProACT research programme focuses on socio-economic changes and phenomena which are significant to the continuous renewal of Finnish society and its technology policy. The programme consists of 25 research projects which are carried out in Finnish universities and research institutions. The programme has started in the beginning of the year 2002 and will last for four years. The goal of the ProACT programme is to increase understanding and knowledge of the effects of technology, research and technology policy on society and the economy, and of the effects of society on technological development. The results of the programme will be exploited in the development of technology policy, research co-operation, the economy and economic policy. At least four of the 25 research projects are related to KISA. The MTI and Tekes are responsible for project funding. The total budget of the programme is 11 million euros of which Tekes has financed 1,3 million euros in 2003.⁴⁰

4.5.3 Programmes for Software sector

4.5.3.1 Software Product Industry – SPIN 2000 - 2003

SPIN was a three-year technology programme to boost the software product business in Finland. The programme's main objective was to assist in the generation of new, international, product-based business. In addition to software companies, the technology programme covered other interest groups working in the field as well as companies and actors in the supporting infrastructure. SPIN was co-ordinated by

³⁹ <http://akseli.tekes.fi/Resource.phx/tuma/turva2003/index.htm>

⁴⁰ <http://akseli.tekes.fi/Resource.phx/tekes/proact/index.htm>, <http://proact.ktm.fi/>

Tekes. The projects for the programme were divided into core technology areas and other areas of focus and areas of operation. Core technology areas included:

- Applications for the Internet service infrastructure
- Applications for mobile communications
- New enterprise management software for companies operating in the digital economy.

Other focus areas included computer security, entertainment software, systems and software development tools, software for mobile and other new platforms, modernisation of existing applications, new media technologies, component-based software products and software component products. The timing of the SPIN technology programme was 'spot on', since it helped companies operating in the software product business survive the worst of the consequences of the information technology bubble burst. A total of 110 industrial and 14 academic R&D projects were accepted into the programme. The total volume of the programme was 75,5 million euros, of which Tekes financed over 35 million euros. 65 software companies participated in the Global Software programmes implemented as ancillary projects in connection with the SPIN technology programme.⁴¹

4.5.3.2 Global Software

Global Software is the most comprehensive business development, marketing and networking programme for the leading Finnish software intensive companies targeting or investigating global markets with a focus on North America. The mission of the programme is to discover the most promising Finnish software intensive companies and to assist them in entering the North American Market with efficient processes that enhance their possibility of success. Global Software is delivered by a US and Finnish team of executives with demonstrated experience in successful North American start-ups. Global Software provides a network of prominent business practitioners in all major US high-tech hubs: Silicon Valley, Boston, Atlanta, Minneapolis, Dallas etc. More than 60 companies have already participated the previous programs with proven results. Global Software is a non-profit programme coordinated by the University of Oulu. The programme is implemented in cooperation with 5 science parks. It is sponsored by Tekes, TE-Centres, Finnvera, some Finnish companies and venture capital firms. Also from USA the programme is sponsored by Silicon Valley Bank and Georgia Centers for Advanced Telecommunications Technology.⁴²

4.5.3.3 Intelligent Automation Systems – ÄLY

The Tekes technology programme ÄLY is focused on the new challenges presented by automation in general and the related software engineering in particular. Software engineering has now become a key discipline both in product development and in application engineering. Automation represents a most challenging application field for modern software and information technology. ÄLY technology programme aims at:

⁴¹ <http://akseli.tekes.fi/Resource.phx/tivi/spin/index.htm>

⁴² <http://oyt.oulu.fi/globalsoftware/>

- Supporting the R&D needs of the domestic automation industry
- Developing the knowledge and know-how of both industry and academia
- Utilising the rapidly-developing information technology in automation and industrial production
- Providing a basis for new enterprises in the field
- Forming many kinds of partnerships and networked business structures among vendors, service companies, software houses, and other related sectors
- Enabling and enhancing networked software production and trade

ÄLY programme promotes the quality, demand and the supply of KISA, especially software related. The total budget of the programme is 45 million euros of which Tekes has financed 5 million euros in 2003. 55 companies and 20 research organisations has participated in the programme.⁴³

⁴³ <http://akseli.tekes.fi/Resource.phx/tivi/aly2000/index.htm>

5 Summary of the identified measures

There are a number of policies and programmes in Finland that are directed to service cluster, but very few policy measures that explicitly target knowledge intensive business services (KIBS) and other KISA actors. However, the number of measures increases significantly, once indirect influences to KISA are also included into the picture. In fact, most of the measures aimed at knowledge development do have some potential influence on the supply, quality and demand of KISA, not to mention KISA activities within organisations.

The focus of this paper is limited to knowledge intensive services for software sector. The review could pin point only one measure that is explicitly targeting the development of KIBS for the software industry. This Tekes programme is, “The Methods and Instruments of Software Production” (section 4.5.1.4). However, several programmes that enhance the demand for KIBS/KISA within the software cluster, or more broadly, were identified. Exhibit 6 brings together the most relevant KISA related policies, instruments, services, programmes and organisations reviewed in this report.

Exhibit 6 Key organisations and measures promoting KISA

Finnish Parliament						
Government	Government programmes (e.g., Lipponen II)					
Ministries	Ministry of Agriculture and Forestry MMM	Ministry of Labour MOL	Ministry of Trade and Industry MTI	Ministry of Education	Ministry of the Interior	
Agency level actors	TE-Centres		Tekes	The Academy of Finland		Sitra
Strategy level acknowledgement of KISA			Mission statement, vision and technology strategy			
Financing instruments and services	Expert service packages		TULI, VARA, TUPAS			LIKSA
Programmes promoting:						
Software			NETS, DENSY, FENIX, UTT, MISP*, SPIN, GBSW**,		CoE for SW	
KISA			DENSY, Security, UTT, MISP*, ELO, NETS, DENSY, TURVA, ProACT,	LIIKE	CoE	
KISA to SW			NETS, FENIX, LIIKE, UTT, MISP*,		CoE for SW	
Business and innovation support for KISA	Universities, Business incubators, Science Parks and Centres of Expertise					

MISP* = The Methods and Instruments of Software Production

GBSW** = Global Software

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Appendix A Finished Tekes' Technology Programmes for Service Industry

Competitive Reliability

In the course of Tekes' Competitive Reliability Technology Programme, which came to a close in spring 2001, several Finnish companies improved the reliability of their products. The investments in industrial reliability brought the companies savings and increased their sales. The new methods were applied in processes of the paper, steel and metal industries, as well as products, such as forest machinery, diesel engines, lubrication systems, valves and mobile phones.

Launched in 1996, the programme involved 78 Finnish businesses and over two hundred researchers and industrial consultants. Among the most significant achievements of the programme were a new product design method which includes reliability calculations, and which has now been applied in ten Finnish products, two stamp-size new micro sensors for detecting leakages, a more reliable method for process valve adjustment, a "black box" collecting loading data of forest machines, and new evaluation methods for the human factors to be applied in power plant and paper mill environments. The total budget of the programme was around 12 million euros of which Tekes financed 5 million euros.

Control of Vibration and Sound - VÄRE

Excessive vibration and sound can cause comfort and safety problems in machines and buildings. Both consumers and official regulations call for lower vibration and sound levels. More advanced control of sound and vibration can improve working conditions, living comfort, and the environment - and thus the general quality of life. In addition to a low level of sound, the quality of sound can also be a factor in improving the competitiveness of a product. The VÄRE programme's objectives were to improve the competitiveness of Finnish industry by developing the vibration and sound properties of their products by utilising the technologies of vibration and sound control, to develop and introduce modern design methods which can integrate the vibration and sound control into the product design process and to increase the general level of knowledge and co-operation in the field of vibration and sound control.

Tekes' Technology Programme VÄRE run from 1999 to 2002. The total budget of the programme was some 13 million euros of which Tekes financed approximately 8 million euros.

Diagnostics 2000

Tekes' Technology Programme Diagnostics 2000 was launched in 2000 and ended in 2003. The programme focused on Tekes financing in the field of diagnostics in a manner which will most effectively increase the international competitive position of enterprises. The aim was also to launch new commercial operations.

One of the most important goals of the programme was to achieve a functional network for cooperation among companies producing diagnostic devices and the universities and research institutes developing new methods. In this way the innovation chain from research to product could be significantly accelerated, and the compatibility of methods and equipment could be ensured.

The technology programme had been planned in close cooperation with the Finnish In Vitro Diagnostic Industry Cluster (FIVDIC). In practice, enterprises in the field operating in Finland were members of the cluster. During the preparatory phase, Tekes technology experts abroad had surveyed diagnostics sector prospects in the United States, Japan, Germany and the UK.

31 public research projects and 28 industrial R&D projects participated in the programme. The total budget of the Diagnostics programme was 33 million euros of which Tekes financed 20 million euros.

Global Project Business – GPB

The Global Project Business (GPB), a Tekes' Technology Programme, run from 1998 to 2001, and produced newly developed operative models for global business. It also brought a number of new commercial products to the market. The GPB programme aimed at supporting the competitiveness and profitable growth of Finnish project business in the global market. The research projects produced mostly new procedures and new knowledge, and a few projects introduced new tools. A majority of the business projects were multi-faceted process development projects focusing mainly on short-term goals. The results consisted of new procedures, methods and tools for the companies' own use. Some of the business projects also produced commercial products and services.

16 public research projects and 19 industrial R&D projects participated in the programme. The total budget of the GPB programme was some 12 million euros of which almost 5 million euros was grants from Tekes.

Transport Chain Development Programme – KETJU

Jointly launched by Tekes and the Ministry of Transport and Communications in 1998, the Transport Chain Development Programme reached the goals it was originally set. The programme focused on international transport chains by assessing them from functional as well as technological aspects. The programme ended in 2002.

The projects in the programme produced the desired concrete results. Perhaps the most significant impact was created by the VIPRO project, upgrading the forest industry export delivery process. A joint project by Multilift Oy and Närko Oy, it produced a new container handling device, and, for example, a new container loading and unloading system, Loadplate, was designed for Naaraharju Oy.

About 40 projects took part in KETJU programme. The projects reached a total value of 17 million euros with 43% financial support from public funding. The share of the funding provided by the Ministry of Transport and Communications and Tekes was

about 90%, but some of the projects were also financed by the Academy of Finland, MTI, regional EU funds and EU research funds.

Water Services Technology Programme

Tekes' Water Services Technology Programme run from 1997 to 2001. A collaborative work by Finnish research institutions and the water industry, the programme's main idea was to improve technological expertise of businesses working in the field of water services. Targeted impacts included increasing the preparedness to introduce new technologies at water and sewage works, introducing new products designed to satisfy water service needs of rural areas, as well as promoting related research and development activities.

The programme in grassroots level aimed to provide high quality drinking water, improve maintenance of water and sewerage infrastructure, and find ways to treat and dispose municipal wastewater and sludge. As a result, it has effectively highlighted the water service needs of rural areas as well as control local pollution sources that affect community water services.

The total budget of the programme was over 11 million euros, of which Tekes financed 50%.

Healthy Building

The Construction Technology, Indoor Climate and Quality technology programme, otherwise known as the Healthy Building Programme, was a Tekes' Technology Programme and was implemented between 1998 and the year 2002. The scope of the programme was to cover the entire real estate and construction business and also to involve closely the health sector. The Healthy Building Programme will foster cooperation between real estate and construction companies and research institutes.

Among other things, the programme aimed to improve the current lifecycle of buildings and extend their service life. It was hoped that the programme would assist in correctly targeting investments in building renovation. Better indoor air was also expected to enhance the level of public health.

General objective of the Healthy Building Programme was to enhance know-how and health education associated with the physical aspects of indoor air and construction to the level where this know-how becomes a key success factor internationally. This was to be achieved through collaborative work in the real estate and construction business, the public health sector, the manufacturing industry and the research sector.

The Healthy Building Programme consisted of 123 projects, and the total volume of the programme was nearly 23 million euros. Tekes financed 12,4 million euros.

Industrial Applications of Multimedia

The Industrial Applications of Multimedia Programme was a Tekes' Technology programme. It was launched in 1996 and it run until 1999. The programme was focused on improving the competitiveness of products, manufacturing processes and

services in industry via the integration and adaptation of multimedia technology and information processing systems. Networking between enterprises took also place and new operating paradigms were established to take advantage of modern telecommunications and multimedia solutions.

The objectives of the programme were to establish new and revamped products and processes, to develop new operating paradigms and applications and to create successful new businesses through new services and by overhauling existing industrial sector. The projects enhanced close co-operation between producers, subcontractors and end-user enterprises, as well as research institutes in order to gain the full benefits of synergy.

Information Technology and Electric Power Systems Technology Programme - TESLA

Tekes' Technology Program TESLA run from 1998 to 2002. For Finnish players on the electricity market, the programme provided the means for improving network management and use, for managing electricity procurement and sales, and for making the use of energy more effective. The programme included both confidential product development projects carried out by companies and research-based joint projects taking place at research institutes and companies.

Programme areas of TESLA were:

- Distribution network automation. Making more efficient use of distribution networks, monitoring their state, and using new tools to measure component condition.
- Management of industrial electrical systems. Optimizing energy use and supplies; monitoring the state and reliability of industrial electricity networks.
- Information systems for electricity trading and risk management.
- Demand side management. IT solutions, terminals and control systems for communication between power companies and electricity users. New service concepts for power companies.
- Applications of new telecommunication technologies in electricity distribution.

The total budget of the programme was over 27 million euros of which Tekes financed nearly 13 million euros.

Quality in Business Networks

Tekes' Technology Programme Quality in Business Networks Technology Programme run from 1998 to 2001. The programme aimed at developing new operative models and methods for exploiting networks. In the business network development projects, the operations of networks were improved through newly developed methods, as well as by extending the use of existing tools in networks. In terms of competitiveness, significant improvements were achieved in, for example, delivery reliability and throughput times. Good results have also been achieved when a network between companies manages to create a secure and open atmosphere. Tekes financed 5 million euros of the programme's total budget of 11 million euros.

Electronics for the information society – ETX

ETX was a Tekes' Technology Programme. The programme aimed at enhancing techno-logical competitiveness, creating new businesses and developing new information technology in the service of industry, commerce and employment, thus making Finland known as the home of high technology. An important goal was also to promote networking between and within the research organisations and companies. The ETX programme ran for five years from the beginning of 1997 through to the end of 2001.

Due to the demand and great interest of the participants, the ETX programme became the largest programme in the history of Tekes. The programme embraced 194 projects, the total volume amounting to 154 million euros.

The programme projects were organised into 11 thematic groups: Systems and Software, Broadband Electronics, ASIC Design, Modern RF Electronics, Power Electronics, Mechanics of Electronics, Materials for Electronics, Competitive Production, Total Reliability of Electronics Systems, Environmentally Recommendable Practices and Services for Electronics Industry.

The programme consisted of 194 projects and their total volume rose up to 154 million euros. A little under half of the volume was financed by Tekes.